table lands, would proceed with accelerated speed, from the growth of vegetation, and the storms bursting and breaking down large masses of materials from the steep sides of the newly formed ravines, each mass, in turn, assisting to destroy not only itself, but the other materials obstructing it in its course.

In the earlier ages of such a period as that which we have been contemplating, the flat coast known as the Ninety-Mile Beach, and the coast lakes, with their surrounding low lying land, could have no existence, whilst the waters of the ocean would roll unchecked, up the long narrow valley of the La Trobe, now occupied by rich alluvial marsh lands and back waters, and in all probability the marshes of the Morewell and the Moe, south of the La Trobe would be brackish, if not sea-water lakes.

The material worn out from the former undulating high lands of the ranges, would be sufficient to reclaim the whole of the La Trobe Valley and form the low lands around the Coast lakes—together with the Ninety Mile Beach.

Such are the views I have formed from the examination of the physical features of the district, and although such examination has been of necessity a very cursory one, I believe the views put forward will be found to be supported by a more careful scrutiny of facts.

This paper is in itself somewhat crude, from the want of time for preparation, but such as it is, I hope it will be accepted rather as suggestive of a question of great interest, which deserves a fuller examination and profounder thought than I have been able to afford to it.

ART. III.—*On the Skeleton of the Gorilla.* By GEORGE B. HALFORD, M.D., Professor of Anatomy, Melbourne University.

[Read 24th July, 1865.]

Owing to the energy of Professor M'Coy, Melbourne has been enriched by the acquisition of skeletons and stuffed specimens of the Gorilla; and we are further indebted to him for permitting one of the former to illustrate our discussion this evening. It would not be right were I, comparatively speaking a new arrival, to allow this opportunity to pass without expressing the admiration with which

I always regard our Natural History collection in the National Museum. Nor can I omit to notice the two other glories of the colony, the Public Library and Botanic Gardens. Long may those who preside over museum, library, and gardens, live to reap the honour that is their due.

Of the two Gorilla skeletons in the National Museum, I have made measurements, a table of which will be appended to this paper, but which would be too long and wearisome for your audience. I may observe, however, that the *height* of the male skeleton as it now stands is five feet two inches; that of the female, in the attitude of a quadruped, two feet ten inches. There is some difficulty in making a correct estimate of the height of the living animal from an examination of the articulated skeleton, but we can make a good approximation. I should say, then, that this male would have measured, from the top of the skull to the sole of the foot, at least six feet. I have compared all my measurements of the separate bones with those given by Du Chaillu of a gorilla which, when shot, measured five feet eight inches extreme length. In this male there is a slight increase in some of the *dimensions of the skull*; thus the *occipital crest* is higher, there is an *additional vertebra*, and the *femur is a little longer*. The *skull* of the male differs from that of Man in possessing this enormous *sagittal crest*. This little male Macaque* has a similar, though not so prominent a one. In the female it is absent, but a rough line, meeting at the vertex, indicates its rudimentary character. It is a *sexual* distinction not existing in the young of either sex of gorilla or macaque. Its use is for the attachment of a powerful muscle, with the excessive development of which it rises to move the lower jaw, as in biting. It accompanies a *similar excessive development of the canines* in the male. In the human skull it is only a rough curved line, situated altogether at the side, the greater part of the broad roof lying above it. It is the difference of situation, and not the height to which this crest rises, that is of importance in distinguishing the ape's from the human skull. This great crest meets another, the *lambdoidal*; it is seen in this male macaque, and also, though much less prominent, in the female. No similar ridge exists in man, the occipital and parietal bones being united by suture. Beneath this ridge the posterior

* Skeletons of Man and of Macaque were exhibited for purposes of comparison.

surface of the skull in the gorilla and macaque slopes towards the *foramen magnum*, or place of junction of the cranial and spinal cavities, and is externally concave. In man, this same region is convex. The plane of the *foramen magnum* is inclined to that of the horizon in the gorilla and macaque, and the head is not balanced on the top of the spinal column, as in man ; and in the gorilla, owing to the great development of the bones of the face, requires a development of the muscles of the back of the neck to uphold it, as is evidenced by these brutal spinous processes. The *supra-orbital ridges* are strongly marked, both in gorilla and macaque, and, as has been remarked by Professor Owen, it is difficult to conceive, upon the 'derivative hypothesis,' what external influence could produce them, seeing that they are quite without the influence of any muscular action whatever. Owen says further, that where they bend down to meet the malar bones, and form the outer boundary of the orbit, if viewed from the side, no part of the orbit is seen in advance of this border. In these specimens, however, and in macaque, a small part of the lachrymal bone is still seen. In man, the outer wall of the orbit is less prominent, so that he can, *by simply turning the head, the body remaining fixed, see all points of the horizon*, a provision in harmony with his usual erect attitude, and especially made use of when flying from a pursuer, whether on horseback or on foot, and in the more genial though not less stirring contests of the course, &c. The *Post condyloid process of the squamosal*, or *middle root of the zygoma*, is so large in in both gorilla and macaque as entirely to separate the condyle of the lower jaw from the auditory process, which is not the case in man. There are many points of great interest in this region too minute for notice this evening. The gorilla makes some approach to the possession of a *mastoid process*, whereas in macaque there is none. The articulated condition of these skeletons prevents my following out the comparisons of the interior of the skull. I have, however, in my *Lines of Demarcation between Man, Gorilla, and Macaque*, carefully examined all that has been said on this subject by Professor Owen. As his papers in the *Zoological Society's Transactions* are illustrated, the comparisons are easily made between the segments, sutures, and proportions of the cranial cavity in man, gorilla, and macaque. The differences between man and gorilla in this important region are truly immense ; between gorilla and macaque so trifling, that in

viewing this *basis cranii* of the macaque, you have that of the gorilla in miniature before you, any superiority of capacity however, belonging to macaque, for I find that, by adopting the method suggested by Professor Huxley, the *cranial capacity* of a macaque is 182, the basi-cranial axis being taken as 100. Examined in the same way, that of the gorilla, according to Professor Huxley, is 170 ; that of a baboon, 144 ; of a lemur, 119 ; of a beaver, 70. Of the *Bones of the face* of the gorilla, the *Upper Maxillary* differs greatly from that of man, but closely resembles that of macaque. In both gorilla and macaque it forms no part whatever of the front boundary of the nostrils, which is completed below and at the sides by the *Premaxillaries,* and above by the *Nasals.* In man, the lateral boundaries of the anterior opening of the *nostrils* are formed by the *upper maxillaries* alone. This specimen shows well the situation and connexion of the *premaxillaries*—that portion of the upper jaw which, separate in the fœtus, eventually becomes united to the rest of the bone, and supports the incisor teeth. The *Teeth* of the gorilla, although agreeing, like macaque, in number with those of man, present in other respects some most remarkable differences. I must call your attention not only to the skeleton of the male, in which the *canine* teeth are broken, but also to this cast of the head of a fine old male. Look at these *enormous canines* ; look at them, comparatively as large and *similarly grooved,* in this male macaque. Now turn to the female, and they are not more developed than the other teeth. Why is this ? The answer is, they are weapons of offence and defence, for neither the gorilla nor the macaque is a flesh-eater. Du Chaillu distinctly tells us that he never found other than vegetable food in its stomach ; but affirms that he had several times noticed skulls in which the large canines were broken off, not worn down. The negroes informed him that such teeth were broken in combats between the males for the possession of a female. Now, consider this subject well. These teeth are *formed* in the jaw *before birth* ; say at the sixth month of fœtal life their future form is sketched, and ere one year they begin to calcify or harden, and some years later, that is at or before puberty, they displace the milk or temporary set. On this subject, the arguments of Professor Owen as against the transmutation theory are so unanswerable that I will quote them. He says :—'The weapon is prepared prior to the development of the forces

by which it is to be wielded; it is therefore a structure pre-ordained, a predetermined character of gorilla, by which it is made physically superior to man, and one can as little conceive its development to be a result of external stimulus, or as being influenced by the muscular actions, as the development of the stomach, the testes, or the ovaria.' The *Præmolars* of gorilla and macaque differ equally from those of man, in having one fang more, besides that the crown of the first of the lower jaws is much larger than the crown of the second, and its face worn down by the action of the upper canine. Thus, then, we have sketched out a head, brutal in form, and, so far as its original segments are concerned, vastly removed from that of man. One last point I will notice as illustrating many that might be demonstrated, could we examine the interior of the brain-case. At the bottom of each *orbit* in man a *horizontal fissure* exists between the *oribito-* and *ali-sphenoids* for the transmission of motor and sensory nerves to the eye, and of sensory nerves to the forehead, nose, and eyelids. This fissure is usually formed into a foramen by the junction of the outer angle of the oribital plate of the *frontal*. I say usually, for I have seen the oribito- and ali-sphenoid meet, and convert it into a foramen. This, however, is very exceptional, so much so as not to be mentioned by Owen and most anatomists, not even by Ward, who has described more minutely than any other writer the characteristics of the human skeleton. It is very different, however, in gorilla and macaque. Instead of a wide fissure, *a square-shaped hole* is seen, resulting from the union of the *oribito-* and *ali-spenoids* close to their origin. It has further been pointed out by Owen, and may be seen in this skull of the macaque, that there are no *ridges* to the *alæ minores* defining the fossa for the anterior lobe from that for the middle lobe of the brain, as in man, *a short triangular plate* answering to the rudiments of the *alæ minores* and to the bases of the anterior clinoid processes, but not extending backwards, as in man. Such characters as these, and there are *many such* in the skull, by which both gorilla and macaque are distinguished from man, could never result from external causes; they are quite without the influence of muscular action, and are handed down from parent to offspring; and their importance may be judged of when we consider that the brain case is made for the brain, and not the brain for its case, and that all other parts of an animal's frame are brought into

harmony with this great seat of sensation and volition. The examination of the skull would then lead us to infer a great predominance of brutal instincts in the gorilla. How far does this agree with what is known of its habits? Du Chaillu says, 'I think the gorilla utterly untameable.' Of a young one in captivity, not yet three years old, two feet six inches high, and possessed, for its age, of most extraordinary strength and muscular development, he says: 'He sat in his corner looking wickedly out of his grey eyes, and I never saw a more morose or ill-tempered face than had this little beast. The second day he was fiercer than the first. He rushed savagely at anyone who stood, even for a moment, near his cage, and seemed ready to tear us all to pieces.' Further on—'I never saw so furious a beast in my life as he was. He darted at everyone who came near, bit the bamboos of the house, glared at us with venomous and sullen eyes, and in every motion showed a temper thoroughly wicked and malicious. As there was no change in this for two days thereafter but continual moroseness, I tried what starvation would do towards breaking his spirit. He always snarled at me, and only when hungry would he take the choicest food from my hands. Ten days after he was chained he died suddenly. To the last he continued utterly untameable.' Of the *Vertebræ*.—In the male there are *seven* in the cervical region, which are remarkable for their enormous spinous processes; in the dorsal *fourteen*, *i.e.* vertebræ articulated to movable ribs, *four* lumbar, and *five* sacral; in all, *thirty*. In the female there are *seven* cervical, *thirteen* dorsal or costal, *four* lumbar, and five sacral; in all, *twenty-nine*.—In man, *seven* cervical, *twelve* dorsal, *five* lumbar, and *five* sacral; in all, *twenty-nine*. There is a *great approach to man in the lower dorsal and upper lumbar vertebræ, at the same time that there is a great departure from macaque*. There are many points of great interest to the student in this region of the three skeletons before you, chiefly in the *mode* of *interarticulation*. Time will permit me of only thus alluding to them. Although there are usually only *twenty-nine* bones in these regions of the spinal column in man, we have a skeleton in the University Museum possessing *thirty*, the additional one being in the sacrum; the number of costal vertebræ are, however, only twelve. The *Sacrum* in the gorilla is much narrower and less curved than in man, affording a *very poor base of support* to the vertebræ above,

at the same time that the last two lumbar vertebræ are locked in between the iliac bones. The sacrum of the macaque is proportionally broader and more curved than that of the gorilla ; although tailless the sacral canal of the gorilla is more closed than in man. The *Pelvis* of the gorilla at first sight approaches the human in form ; the *ilia, or haunch bones,* are expanded and hollowed out on their inner surfaces, as in us ; but a closer inspection proves this part to be structurally and functionally very different. The ilium of the gorilla has no curved crest, as in man, nor are its surfaces alternately concave and convex as in him ; the outer surface, except quite posteriorly, is one large convexity, and all the spines are less distinct. Of the *Pubes.*—The *pecten* is very prominent, and is all that remains of the upper surface of the horizontal ramus ; the symphysis is much longer. Of the *Ischium.*—*The spines are absent, or quite rudimentary,* and the tuberosities everted, so that they project beyond the lower margins of the acetabula. The *obturator foramen* has its diameter passing from above downwards and inwards, in man downwards and outwards. There are many other points by which the pelvis of the gorilla approaches, in spite of these expanded haunch bones, that of the macaque, and inasmuch as he approaches macaque he recedes from man. I will not trouble the meeting with the measurements I have made of this part of the skeleton ; for the present, let me observe that this expanded portion or ilium is by far less important, physiologically speaking, than this lower portion, or *true pelvis,* which constitutes the passage through which the little stranger is brought into the world. Its *diameters* in the human species are therefore carefully studied, both by the accoucheur and physiologist, and one never ceases to admire how exactly its shape and size are adapted to the fœtal form. But in gorilla and macaque, as indeed in *quadrupeds,* the diameters of this cavity are the reverse of those in man, the *antero-posterior* of the inlet exceeding that of either the *oblique* or *transverse.* Moreover, there are no prominent *ischial spines,* as in man, so that the mechanism of parturition must be very different in man and gorilla, very similiar in gorilla and macaque. Time will not permit me to dilate as much I should wish upon this important part of the skeleton. Enough, however, has been said to show that it constitutes another great structural and fundamental distinction between the human species and the

gorilla, and all the quadrumana. Moreover, there is probably another great difference in this region between man and gorilla. I am informed by my friend and colleague, Professor M'Coy, that in the chimpanzee, by many supposed nearer to man than the gorilla is, a bone exists in the *penis*. I found one also in the penis of the macaque, and it is most likely one will be found in the gorilla, as the drawing of this organ in Professor Duvernoy's plates resembles that of the macaque. Nothing of the kind has ever been discovered in any variety of the human species. Now it is an universal law that no part of the body withers and dies out, unless from disease. Use and nutrition being the same, a part remains the same, and when we come to the question of descent, this is the very part of an animal that must have been used to have raised our question. What reason have we to believe that our old quadrumanous ancestor was less active in this matter than are the apes and monkeys of the present day? Those who, striving to uphold the doctrine of the transmutation of species, say that if not *of* the apes we may be *from*, should tell us how this bone has disappeared from man. This may be the place to say that the *young* gorilla, like the young of brutes in general, becomes sooner independent of its parents than the young of the human species. Little Joe, as Du Chaillu calls him, was not three years old; his height was two feet six inches. This is rather short for a child of the same age. Yet Du Chaillu was compelled, in order to bring him in, to take 'hold of the back of his neck, two men seizing his arms and another his legs; and thus held by four men, this extraordinary little creature still proved troublesome.' The *Scapula*, blade bone, has some points of resemblance to the human. It differs in the spine springing further from its posterior border, and making the *supra* and *infra-spinous fossæ* of more equal dimensions. It does not present, as in man, a generally concave surface for origin of the *subscapalaris*, but a median convexity towards the thorax. In this and in the following particulars, it approaches more the scapula of macaque, viz., a well-marked elongated excavation for the long head of the *triceps* muscle and part of *subscapalaris* and a proportionally larger *coracoid process*. The *Humerus*, both in man and macaque, is shorter than the *femur*, but in the gorilla it is much longer than the femur. Excepting its size, and the more prominent outer convexity of its inferior trochlear surface and the boundaries of the

olecranon fossa, it is more like the same bone in man than in macaque. The *Ulna* and *Radius* are more bowed and strongly marked for origin of muscles than in man. The *lesser sigmoid cavity* of the radius is, as in macaque, further removed from the shaft than in man. The Hand is of a large size, the *pisiform bone* and *phalanges* being greatly developed, the former for bending the wrist, the latter for grasping. *Upper Extremity.*—This really *imposing* part of the gorilla's skeleton differs widely in its uses from the upper extremity of man. Of the varied functions which the hand of man performs I need not speak. In the gorilla its chief use is for *grasping* and *progression*. It is in this latter he loses all resemblance to man and approaches the macaque. The excessive length of the arms enables him to walk as a quadruped, and more especially, by the enormous development of the *pectoral muscles* and by the peculiar attachments of the *lalissimus dorsi* and *dorso epitrochlearis* muscles, the latter not existing in man, but present in the macaque, to *draw his huge body after him*, as in *climbing*. Du Chaillu says: 'The skin on the back of the fingers, near the middle phalanx, is callous and very thick, which shows that the most usual mode of progression of the animal is on all-fours.' Again: 'The common walk of the gorilla is not on his hind legs, but on all-fours. In this posture the arms are so long that the head and breast are raised considerably, and as it runs the hind legs are brought far beneath the body. The leg and arm of the same side move together, which gives the beast a curious waddle. It can run at great speed.' The *Femur*, both in man and macaque, is longer than the humerus, but in the gorilla it is shorter. It differs in other most important respects from the same bone in man. Thus in man the femur has *two obliquities*, one of the *neck* and another of the *shaft*, whereby the lower extremity is approximated to its fellow, that the feet may be conveniently brought within the area of support. In the gorilla there is only an inclination of the *neck*, and none of the *shaft*, so that the lower end is as far from the median line of the skeleton as the upper or farther—a disposition favourable to a *quadrupedal*, but not to a *bipedal* walk In the proportionate size of the *trochanters*, it resembles more the femur of the macaque than of man. *The Leg.*—There is a curious similarity between the relative lengths of the leg and foot in both gorilla and macaque, by which they differ equally from man. Thus, the length of the *tibia* in man is 16 in., of the

foot 10 in. ; in gorilla, the *tibia* is 12½ in, the *foot* 12 in. ; in macaque, the *tibia* 4¾ in., *foot* 4½ in. *The Foot.*—The *Tarsus* presents the following points for observation : The *Os Calsis* is more slender than in man. The inner surface is more curved, the lesser process projects more inwardly, and both outer and under surfaces are more arched. The *Astragalus* is grooved both by the tendon of the *flexor longus pollicis*, and by that of the *flexor longus digitorum.* In man, it is grooved for the *flexor longus pollicis* alone. Passing by other points, which time will not allow of noticing, we arrive at the *Internal Cuneiform* bone, and here we see, as in macaque, a change in harmony with all that has gone before ; the surface which articulates with the great toe or hind thumb, as near as possibly resembles the surface of the *trapezium* which supports the thumb of man ; thus, putting the *fore arm* and *hand* in the same position as the *leg* and *foot*, I can describe the articulating surface of both the *internal cuneiform* bone and *trapezium* in nearly the same terms. And with reference to the median line of the skeleton, say that it looks inwards, and is partially concave from above downwards, convex from side to side, and supports a movable and opposable thumb. Such a description would not suit the corresponding bone in man. Finally, of the *Phalanges.*—Each corresponds in development with that of the *hand* of man, gorilla, and macaque, none agreeing with the corresponding toe of man. I have elsewhere shown that the muscles of these hind fingers and thumb agree with those of the hand, and not with those of the foot of man. The following table renders this clear. The letters prefixed to the numerals express the relative lengths of the digits, *a* being the longest, *b* the next, and *e* the shortest :—

MAN.

(No. 1.)

HAND.

MUSCLES OF.

e. First digit, opponens.
c. Second digit, abductor, adductor.
a. Third digit, two abductors.
b. Fourth digit, abductor, adductor.
d. Fifth digit, adductor, opponens.

(No. 2.)

FOOT.

MUSCLES OF.

b. First digit, transversus pedis.
a. Second digit, two abductors.
c. Third digit, abductor, adductor.
d. Fourth digit, abductor, adductor.
e. Fifth digit, adductor.

MONKEY.

(No. 3.)

HAND.

MUSCLES OF.

e. First digit, opponens.
c. Second digit, abductor, adductor.
a. Third digit, two abductors.
b. Fourth digit, abductor, adductor.
d. Fifth digit, adductor, opponens.

(No. 4.)

FOOT.

MUSCLES OF.

e. First digit, opponens.
c. Second digit, abductor, adductor.
a. Third digit, two abductors.
b. Fourth digit, abductor, adductor.
d. Fifth digit, adductor, opponens.

Tables Nos. 1, 3, and 4 *are alike*, so that if the digits of the hand of man be fingers, so must they be in both hand and foot of monkey, for 'things which are equal to the same are equal to one another.' No. 2, however stands *by itself* the foot of man. But I must tell you, gentlemen, that my views are not generally received. It is supposed I do not know these muscles when I see them. A reviewer in the *Lancet*, December 12, 1863, says that he has found the '*transversus pedis* muscle largely developed in *macacus rhesus*.' And further on, speaking of the *opponens pollicis*, he adds : 'So far as we have been able to ascertain, no author has hitherto described this muscle in the hinder extremity of any animal, and we have never ourselves been able to find any trace of it, though we have recently examined several monkeys with this special object in view.' Now, I should be very sorry to mislead this Society, but I affirm that the '*opponens pollicis*' exists in in *every macaque* I have examined, and that the '*transversus pedis*' does not ; and, moreover, all the muscles referred to in these tables have been most carefully examined, and their

existence confirmed, by my friend Dr. James Robertson, with whose permission this statement is now made. I have also demonstrated to Professor M'Coy the exact origin and insertion of these several muscles. The reviewer above alluded to disposes of me in the following manner: 'The tables given at page 14 have, at first sight, the convincing aspect of anything taking the form of a mathematical demonstration; but as the premises have been shown to be incorrect, it is needless to follow out the working of the problem.' *Now, I have shown you that the premises are true.* But is the foot of the gorilla as *prehensile* as such an arrangement of bones and muscles would imply? Du Chaillu, speaking of a young one, says: 'He would come sometimes quite readily, to eat out of my hand, but while I stood by him would suddenly put out his foot and grasp my leg. Several times he tore my pantaloons in this manner. Again speaking of another: 'Several times I had narrow escapes of a grip from her strong great toe.' Of the adult he says: 'The foot of the gorilla presents a great likeness to the foot of man.' In another place he has: 'The sole of the foot looks somewhat like a giant hand of immense power and grasp. The transverse wrinkles show the frequency and freedom of movement of the two joints of the great toe, proving that they have a power of grasp.* Of the *Erect Position* said to be assumed by the gorilla.—It will be as well first to glance at the human skeleton, and see what are the provisions there made for such an attitude. The *transverse vertical plane of the centre of gravity* of the human body passes through the *condyles of the occipital bone,* then through the alternately *curved spine* to the *joint* between the last *lumbar vertebra* and the *expanded sacrum*; continued downwards, it runs through the *heads of the thigh bones, knee joints,* and *ankle joints* to the *feet.* The *longitudinal vertical plane* must pass also along the *spine,* and the *horizontal plane of the centre of gravity* has been found by Weber to pass likewise through the same *lumbo-sacral articulation*; hence the erect attitude is natural to man. The skeleton of the gorilla is, as has been seen, not adapted to

* "The disposition of the hallux as a hind thumb with the concomitant modification of the tarsal bones, are as strongly marked in the Gorilla as in any lower Quadrumane, and the contrast between the foot-structures of the Gorilla and negro is as great."—*Prof. Owen, Trans. Zoolog. Soc.* vol. v. part iv. page 269.

such a position. The head is not balanced upon the top of the spine, but is upheld by large muscles attached to the enormous cervical spines. The spine is not more curved than that of an elephant, and the knee joints, except when the powerful and peculiar adductors, similar in macaque, are put in action, are too much separated for other than a quadrupedal walk. Of the erect position of the gorilla Du Chaillu says: 'His manner of approach gave me an opportunity to see with how much difficulty he supports himself in the erect posture. His short and slender legs are not able firmly to sustain the vast body. They totter beneath the weight, and the walk is a sort of waddle, in which the long arms are used, in a clumsy way, to balance the body, and keep up the ill-sustained equilibrium. Twice he sat down to roar, evidently not trusting himself to this exertion while standing.' Again: 'I have frequently observed the fact that the gorilla is not able to preserve himself for any considerable length of time in the erect attitude.' Old Andrew Battel says, speaking of the pongo, which was most likely the gorilla: 'He differeth not from man but in his legs; for they have no calfe. Hee goeth always upon his legs, and carrieth his hands clasped in the nape of his necke when he goeth upon the ground.' There seems to me some truth here, for this position of the arms, the head being thrown back, would greatly assist in raising and supporting his *enormous belly*. As to the occasional contradictions in all the descriptions of the habits of this animal it is not to be wondered at, seeing that, according to Mr. Ford, 'when he hears, sees, or scents a man, he immediately utters his characteristic cry, prepares for an attack, and always acts on the offensive.' I have thus brought before you as many of the chief points in the anatomy of the Gorilla as time and opportunity would permit. I am at a loss to comprehend what are *ordinal* characters, if those seen in the *skull, teeth, pelvis, organs of generation* and *of progression* are not—characters which, taken together, prove the gorilla as much one of the great natural group of *quadrumanous*, or, more correctly speaking, *cheiropodous* animals, as they separate him and them from Man. With so distinguished a naturalist present as Professor M'Coy, let us hope that additional light may be thrown upon this subject this evening"

Measurements of the Skeletons of the Male and Female Gorilla in the Victorian National Museum, for comparison with those given by M. DE CHAILLU, *at page 379 of his work on "Equatorial Africa."*

	M.	F.
LOWER JAW.	inch.	in.
Length of the inferior maxillary bone, from the inferior angle of the ramus to the canine tooth	5⅞	4⅞
Do. to the median line, measured around to a point between the middle incisors	7	5⅝
Perpendicular height of the ramus of the jaw	4¼	3⅝
Greatest breadth of do.	3⅛	2⅜
Length of alveolus (in a straight line of the teeth)	3⅝	3⅛
Width across the jaw from the outer margin of the last molars	2⅞	2⅜
Do. do. at the canine or bicuspids	2⅛	1⅞
UPPER JAW.		
Length of alveolus from the last molar to the canine	3⅜	3
Do. do. around to the median line	4½	4⅛
Breath across the jaw at the molars	2⅞	2¼
Do. do. at the extremities of canine	2⅞	2¼
SKULL.		
Diameter of nasal aperture	1½	1⅜
Distance from lower margin of do. to the margin of the eye socket	3	2¼
Width of the face, measured across the eyes to the outer margins of the lateral orbital ridges	5⅝	4⅝
Width of the face, measured at the molar protuberances	6⅞	5½
Depth of the eye-socket to the optic foramen	2⅝	2⅜
Greatest length of the face, measured in a straight line from the summit of the orbital ridge to the lowest point of the chin	7½	6½
Distance from the base of the nose to the top of the orbital ridge on the median line	3	2½
Distance from do. to the outer angle of do.	4¼	3⅛
Diameter of the foramen magnum or spinal opening	1¼	1⅛
Distance from the posterior margin of that opening to the lateral termination of the occipital crest	3⅛	2½
Transverse diameter of the base of the skull from the mastoid protuberances	6	4⅛
Length of the occipital crest on its summit	11	7¼
Greatest height of this crest, measured perpendicularly from the surface of the skull	1¼	⅜
Length of the median crest on the top of the skull	5⅞	—
Distance from the summit of the orbital ridge to the point of junction of the crests on the occiput	8	—
(Measured from the highest points of the orbital ridge and the occipital junction of the crests, a line will not touch the skull.)		

LENGTH OF SPINAL COLUMN.

Length of the cervical vertebræ	5⅛ ...	4
Length from the first dorsal vertebræ to extremity of the sacrum	25 ...	19
Total	30⅛ ...	23
Add for shrinkage of the intervertebral cartilages (nearly one-sixth of total length)	5½ ...	3¾
Total length of spine ...	35⅝ ..	26¾

MEASUREMENTS OF THORAX.

Length along the fourth rib, measured from the spine of its vertebra to the articulation with cartilage	13¾ ...	10
Greatest circumference at the level of the eighth rib	44½ ...	—
Length...	14 ...	—
Transverse diameter of apex	4⅝ ...	—
„ „ of base	14½ ...	—
Antero-posterior diameter of base	10 ...	—

PELVIS.

Greatest breadth of pelvis, from crests of the iliac bones	15⅝ ...	13⅞
Breadth of pelvis, measured outwardly and posteriorly from the same points as above	18¼ ...	15½
Height of pelvis (perpendicular measurement)	13½ ...	10¾
Diameters of pelvic strait: sacro-public, or antero-posterior	6¼ ...	5⅞
Diameters of pelvic strait: oblique	5¼ ..	5
Diameters of pelvic strait: bis-iliac, or transverse	5⅛ ...	5⅛

UPPER EXTREMITIES.

Greatest length of the scapula plate	9 ...	7
Length of the humerus to radial articulation	16½ ...	14½
Circumference of the humerus in the middle of its shaft	4⅛ ...	3¾
Do. at the distal articulation, measured around the condyles ...	9 ...	7
Length of radius (fore-arm)	13⅝ ...	11¼
Direct length of ulna	14⅜ ...	12⅛
Length measured on its outward curvature	15⅜ ...	12⅞

LOWER EXTREMITIES.

Length of femur, measured from the round ligament to the lateral margin of tibial articulation	13⅝ ...	11¼
Length measured from summit of the great tuberosity to the lateral margin of tibial articulation	14⅞ ...	11¾
Circumference of the neck of the femur	4⅛ ...	3¼
Greatest circumference of the femur around the two tuberosities	9¾ ...	7
Circumference of middle of the shaft	4⅜ ...	3½
Circumference at the knee, measured over the patella	11⅛ ...	7¾
Length of patella	1¾ ...	1⅛
Greatest length of tibia (perpendicular)	11⅜ ...	9½
Length of fibula from knee to ankle	10½ ...	8¾

THE FOOT.

Greatest length of os calcis	3½ ...	2⅜
Greatest length of right foot, measured on top from tibia to extremity of middle toe	9 ...	—
Do., do., left	8½ ...	7⅛

Length of bones of middle toe from os cuneiform to extremity of the toe...	$7\frac{3}{4}$ ...	6
Do., do., left...	$7\frac{1}{2}$ ...	—
Length of great toe from do., right side	$4\frac{5}{8}$ ...	$4\frac{1}{8}$
Do., do., left side...	— ...	4

THE HAND.

Length of the hand, from the carpal bones to the extremity of the middle finger	9 ...	$7\frac{1}{2}$
Length of thumb	4 ...	3

ART. IV.—*On the Discovery of Cretaceous Fossils in Australia.* By FREDERICK M'COY, Professor of Natural Science in the University of Melbourne, Government Palæontologist, and Director of the National Museum of Victoria, &c.

[Abstract.]

The author stated that he had recently received a small collection of geological specimens, obtained by Mr. Sutherland and Mr. David Carson, of Collins-street, Melbourne, on the surface of a run on the western bank of the Flinders river, at the base of Walker's Table Mountains, in lat. 21° 13′, long. 143°, and presented by those gentlemen to the collection of the National Museum. The matrix is an olive calcareo-argillaceous marl.

The specimens included, besides the vertebræ of a very large teleosteous fish, which it was not possible to determine without further parts, two distinct species of the well-known cretaceous genus *Inoceramus*, with very thick coarse fibrous shells, *Ammonites*, and a few other remains, which, taken together, enabled Professor M'Coy to announce for the first time with certainty the existence of the Cretaceous formations in Australia. Mr. Gregory doubtfully indicated cretaceous fossils in lat. 30° 15′, in his last paper to the Geological Society, but without any generic or specific recognition of fossils of that age. His materials were, unfortunately, sent home, instead of being kept for comparison in the local collections in this country, and they have not been described or definitely identified